Title	**Demonstrate advanced knowledge of mechanical building services**		
Level	**4**	**Credits**	**12**

Purpose	This unit standard is intended primarily for use in the training of personnel in the mechanical building services industry and covers the advanced knowledge of mechanical building services. People credited with this unit standard are able to demonstrate advanced knowledge of the operation of mechanical building services, and mechanical building services control and building management systems.

Classification	Mechanical Engineering > Heating, Ventilating, and Air Conditioning

Available grade	Achieved

Guidance Information

1 Recommended skills and knowledge: Unit 26335, *Demonstrate introductory knowledge of mechanical building services*; and Unit 26336, *Demonstrate knowledge of the components used in heating, ventilating, and air conditioning systems*.

2 Definitions
Advanced knowledge refers to the knowledge expected by industry of a qualified mechanical building services technician. This includes the ability to demonstrate in-depth knowledge of operation of mechanical building services, mechanical building services control, and building management systems.
Air conditioning and ventilation systems include large central air conditioning systems, ducted constant-flow rate and variable-flow rate air conditioning systems, packaged and split air conditioning, heat pumps, supply and extract ventilation systems, fume ventilation, industrial ventilation systems.
Building management systems refer to computer-based systems used to automatically control and monitor mechanical building services systems and other building features such as lighting, security, and access.
Chilled water systems include plain water, brine, and glycol systems.
Gas systems include medical gases, LPG, CNG, oxygen, acetylene, compressed air, and natural gas.
Hot water heating systems include low, medium, and high temperature hot water heating systems.
Industrial liquids systems include dry goods systems such as grains, industrial fluids systems such as inks, systems for slurries such as whey milk products, and pelletized bed systems.

Steam and condensate systems include systems that use gas, coal, oil, or electricity as fuel sources for the heating system components.

Outcomes and performance criteria

Outcome 1

Demonstrate advanced knowledge of the operation of mechanical building services systems.

Range hot water heating systems, chilled water systems, steam and condensate systems, air conditioning and ventilation systems, gas systems, industrial liquids systems;
evidence of one of each is required.

Performance criteria

1.1 The operation of the system is described with reference to inputs and outputs.

1.2 The major components of the system are identified, and their functions and interconnections are explained.

Outcome 2

Demonstrate advanced knowledge of mechanical building services control and building management systems.

Range assessment is limited to the mechanical building services control functions of building management systems.

Performance criteria

2.1 Different types of mechanical building services control systems are identified, and their features are compared.

Range a self-acting system, a stand-alone electrical system, a stand-alone electronic system, a building management system.

2.2 The basic principles of control methods and responses used in mechanical building services are explained with reference to typical applications.

Range methods – open loop, closed loop on-off, modulating;
responses – two position, floating, proportional, proportional-integral, proportional-integral-derivative.

2.3 The operation of a modern mechanical building services control and building management system is explained with the aid of given systems drawings and with reference to processes and components.

Range process may include but is not limited to – control logic; sensing of changes in temperature, pressure, velocity, current and relative humidity; development of a suitable response in accordance with pre-defined settings or program; instruction of controlled devices to respond; storage and dissemination of data;
component may include but is not limited to – self-acting valves, sensors, flow switches, damper actuators, valve actuators, input/output modules, power supply modules, controllers, display modules, networks, relays, contactors, timers, variable speed drives, current transformers, safety devices, energy usage meters.

Planned review date	31 December 2023

Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	16 July 2010	31 December 2023
Review	2	29 March 2018	N/A
Revision	3	24 January 2019	N/A

Consent and Moderation Requirements (CMR) reference	0013

This CMR can be accessed at http://www.nzqa.govt.nz/framework/search/index.do.

Comments on this unit standard

Please contact Competenz qualifications@competenz.org.nz if you wish to suggest changes to the content of this unit standard.